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INTRAGASTRIC ECTOPIC LIVER

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ABSTRACT

Background: Ectopic liver (EL) is a rare developmental anomaly defined as hepatic tissue located outside the native liver without vascular or biliary continuity. It is most commonly reported in the gallbladder but has also been described in other intra-abdominal and extra-abdominal sites. The gastric location is exceptionally rare, with only a handful of cases reported in the literature.

Case presentation: We present the case of a 49-year-old previously healthy male with a 2-month history of dyspepsia and heartburn who underwent diagnostic gastroscopy. This latter showed a 15 mm antral submucosal lesion with central umbilication. Endoscopic ultrasound (EUS) of the lesion showed a well-defined, hypoechoic, heterogeneous 14.2 × 8 × 10.4 mm mass involving the mucosa, muscularis mucosa, and submucosa. EUS-guided fine needle biopsy using a 22 G needle yielded adequate tissue. Histopathological examination demonstrated normal hepatocyte plates with one-cell thickness, highlighted by reticulin staining. Special stains, including Perl's iron, periodic acid Schiff (PAS), and PAS with diastase, showed no abnormal inclusions or hemosiderin deposits, and no pancreatic or ductal structures were identified. These findings were diagnostic of ectopic liver tissue. The lesion showed no evidence of malignancy.

Discussion: EL is usually detected incidentally during surgery or autopsy, and preoperative diagnosis is challenging due to its small size, asymptomatic course, and unfamiliarity among clinicians. Gastric EL is exceedingly rare, with only 3 cases previously described in the pylorus or fundus. Our case is unique as it represents the first reported antral location and was diagnosed preoperatively with EUS-guided biopsy.

Conclusion: Although rare, EL should be considered in the differential diagnosis of gastric submucosal lesions. Histological confirmation is essential to exclude malignant transformation.

KEYWORDS

Stomach, submucosal mass, ectopic liver

LEARNING POINTS

- Ectopic liver tissue in the stomach is very rare and should be looked for during histopathological examination.
- When identifying a well circumscribed submucosal mass within the gastrointestinal tract, ectopic liver tissue should also be taken into account in the differential diagnosis.
- Microscopic examination should be carried out to rule out pathological changes since development of hepatocellular carcinoma is possible.

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INTRODUCTION

Ectopic liver (EL) tissue which is a rare entity that occurs in several organs such as the pancreas, gallbladder, chest, spleen, hepatic ligaments, pylorus, greater omentum, esophagus, gastric mucosa, adrenal cortex, retroperitoneum, pericardium, placenta and umbilical cord[1]. It is usually detected incidentally during laparoscopy or autopsy and is explained by several potential mechanisms[2]. Although it is usually asymptomatic, it develops the same pathologic conditions as orthotopic liver. One reason it can be hard to find is that it is usually small in diameter and does not generally cause a clinical problem. On the other hand, the big difference between ELs and the accessory liver lobes is that EL lacks a connection between the mother liver and ectopic liver[2]. Although ELs do not have clinical importance, they should be looked for during histopathological examination to rule out pathological changes since development of hepatocellular carcinoma is a possibility. In this case report, we presented EL tissue in the stomach of a male, presenting for gastroscopy with dyspepsia and heartburn.

CASE DESCRIPTION

A 49-year-old male, previously healthy, with a 2-month history of dyspepsia and heartburn, presented for gastroscopy as an outpatient. During gastroscopy, a 15 mm antral lesion with central umblication was observed *(Fig. 1)*. Upper endoscopic ultrasound (EUS) was performed and showed: one 14.2 × 8 × 10.4 mm well defined, hypoechoic and heterogenous mass with irregular outer margins involving the mucosa, muscularis mucosa, and the submucosa *(Fig. 2)*. Under EUS and Doppler guidance, EUS-guided fine needle biopsy (EUS-FNB) was performed using the 22 G Boston Scientific Co Acquire needle. One pass was made. Visible tissue was noted. A sample was collected and placed in formalin and sent for histology. Histology showed benign unremarkable gastric mucosa, with benign unremarkable liver parenchyma with one cell thick hepatocyte plates as illustrated by the reticulin fibre special stain *(Fig. 3)*. The Perl's iron special stain was negative for hemosiderin pigment. The periodic acid Schiff (PAS) and PAS with diastase (PAS-D) special stains did not reveal cytoplasmic vacuoles or inclusions. There were no pancreatic acini and no excretory ducts. There was no evidence of spindle cell or epithelioid cell proliferation. The final diagnosis was in favour of a benign ectopic or heterotopic liver tissue with no evidence of malignancy.

DISCUSSION

Since the 1940s, out of 5500 autopsies, only 0.05% had EL, which is considered a rare intra-abdominal lesion[3]. EL in the stomach, which is a very rare entity, was reported in just 3 cases *(Table 1)*.

The liver develops from an endodermal bud from the most caudal part of the foregut around the fourth week of gestation and EL has no connection to the main liver. Several theories have been suggested to explain the occurrence of EL at different sites. These include:

1) The development of an accessory hepatic lobe that has lost its connection to the main liver;

2) Migration or displacement of a portion of the cranial part of the liver bud to other sites;

3) Dorsal budding of hepatic tissue before closing of the pleuroperitoneal canals;

4) Trapping of hepatocyte-destined mesenchyme in different areas, or entrapment of nests of cells in the region of the foregut following closure of the diaphragm[3].

It is difficult to detect EL tissue before surgical intervention or autopsies due to the small size of most ELs, the lack of awareness of this unusual condition among radiologists, difficulty interpreting the image and the frequent lack of symptoms[2]. In most cases, EL is asymptomatic, but in rare cases, EL may cause clinical symptoms like abdominal pain due to compression of adjacent organs and intraperitoneal bleeding[2].

Many authors have pointed out that EL tissue is more predisposed to malignancy than normal liver tissue. Liu et al.[4], reported a rare case of ectopic hepatocellular carcinoma (EHCC) in the pancreatic tail of a 59-year-old

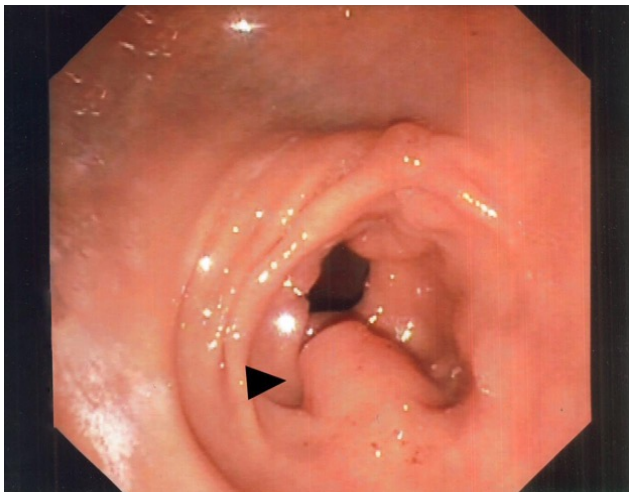


Figure 1. Gastroscopy showing a 15 mm antral lesion with central umbilication (black arrow).

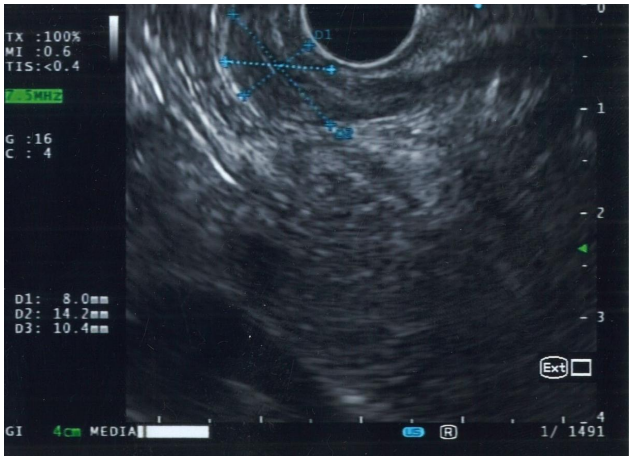


Figure 2. Endoscopic ultrasound showing one 14.2 × 8 × 10.4 mm well defined, hypoechoic and heterogenous mass with irregular outer margins involving the mucosa, muscularis mucosa, and the submucosa.

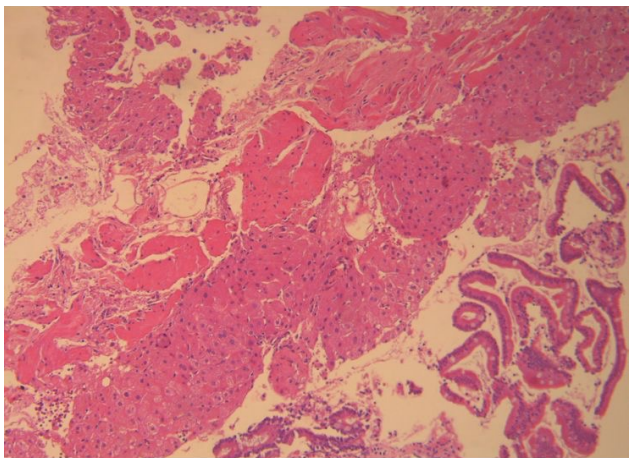


Figure 3. Benign unremarkable gastric mucosa, with benign unremarkable liver parenchyma with one cell thick hepatocyte plates as illustrated by the reticulin fibre special stain.

man presenting with epigastric discomfort. Imaging showed no hepatic lesions. The pancreatic tumour and a concurrent gastric gastrointestinal stromal tumour (GIST) were completely resected. Histopathology confirmed EHCC and GIST. The patient recovered well and has remained disease-free for over 7 years—the second-longest survival reported. Surgical resection remains the most effective treatment for localized EHCC, while metastatic cases carry a poorer prognosis[4]. ELs have completely functional architecture, but may be metabolically handicapped; which may facilitate carcinogenesis. This may have given rise to the hypothesis that ELs are particularly predisposed to the development of hepatocellular cancer. Huang et al. found that ectopic tissue is more susceptible to the development of malignancy because it does not have a complete vasculature or ductal system like a normal liver, and is perhaps functionally impaired[2]. This modified hepatic function may lead to chronic inflammation or cirrhosis, which increases the possibility of developing HCC. The histopathological examination confirms the EL tissue is similar to the normal liver which includes portal areas and a central vein. Resection of the EL with the submucosa is necessary since the perceived risk of malignant degeneration in EL exists[3].

Another common site for EL is in the gallbladder. Arora et al., described 60-year-old man with acute cholecystitis underwent laparoscopic cholecystectomy, during which EL tissue attached to the gallbladder was incidentally discovered. Histopathology confirmed chronic cholecystitis and normal EL tissue[5]. Termos et al. reported a 73-year-old woman evaluated for biliary colic who was found to have a gallbladder-associated mass. Imaging revealed a 3 × 1.5 cm lesion between the gallbladder and liver. Laparoscopic cholecystectomy with en-bloc excision confirmed a hepatic choristoma without malignancy[6]. Hussein Al-Janabi et al., described 2 male patients, aged 52 and 40, who presented with right upper abdominal pain and underwent laparoscopic cholecystectomy for chronic cholecystitis. In both cases, small brownish nodules attached to the gallbladder serosa were discovered and identified histologically as EL tissue[7].

Reference	Age/sex	Clinical presentation	Lesion size (mm)	Location	Imaging/diagnostic method	Histological findings	Immunohistochemistry/ special stains	Final diagnosis	Outcome
Huang et al.[2]	44/F	Abdominal pain	3 × 2 × 1	Stomach (unspecified site)	Endoscopy → Resection	Normal liver architecture with hepatocytes, portal spaces, and central vein	Stains confirmed hepatocytes, bile ducts, glycogen, and liver plates	Ectopic liver tissue	Uneventful recovery
Vormittag-Nocito and Emmadi[3]	73/F	Anemia, multiple myeloma, atherosclerosis	12	Gastric fundus	Endoscopic ultrasound + Biopsy	Polygonal cells with eosinophilic cytoplasm	HepPar1+, CAM5.2+ confirming hepatocytic origin	Ectopic hepatocytes in gastric wall	Pancreatic cyst benign; no complications
Niimi et al.[10]	31/M	Asymptomatic	20 × 23	Gastric wall (4th layer)	Endoscopy + EUS + CT + EUS-FNA	Hepatocytes and bile duct structures	Compatible with hepatic differentiation	Ectopic liver tissue	Diagnosed as intragastric ectopic liver; asymptomatic
Current case	49/M	2-month dyspepsia and heartburn	14.2 × 8 × 10.4	Gastric antrum	Endoscopy + EUS + Doppler + EUS-FNB (22G BSC Acquire)	Benign gastric mucosa with liver parenchyma; one-cell-thick hepatocyte plates	Reticulin (+), Perl's iron (–), PAS/PAS-D (–), no pancreatic acini or ducts, no spindle/ epithelioid cells	Benign ectopic (heterotopic) liver tissue	No malignancy; benign outcome

Table 1. Summary of reported cases of gastric ectopic (heterotopic) liver tissue.

Similarly, Emral et al, reported a 34-year-old woman underwent elective laparoscopic cholecystectomy for gallstones, during which a 10 × 5 mm EL tissue lesion was incidentally found on the gallbladder fundus. Histopathology confirmed normal hepatic tissue without malignancy[8].

EL has also been reported in the umbilical cord and within the subdiaphragm. González Ruiz[1] reported a 33-year-old primigravida with a prenatal ultrasound showing a 28 × 17 mm umbilical cord mass. She delivered a healthy female infant at term, with a 4.5 × 2 × 1.8 cm umbilical cord bulge noted at birth. Surgical exploration revealed a solid mass connected to the umbilical vein and the round ligament of the liver, which was completely excised. Histopathology confirmed hepatic tissue surrounding gallbladder wall elements, consistent with a hepatobiliary choristoma. The postoperative course was uneventful[1]. Jhamb et al.[9], described a 65-year-old woman who presented with postprandial epigastric pain. Ultrasound and computed tomography (CT) scan revealed gallbladder wall thickening and indeterminate soft tissue masses. Magnetic resonance imaging confirmed cholelithiasis with adenomyomatosis and identified a 5.7 × 2.9 × 3.6 cm supradiaphragmatic mass connected to the right hepatic lobe by a pedicle, consistent with an EL. The patient was diagnosed with uncomplicated gallstones and an incidental supradiaphragmatic liver variant, managed conservatively with follow-up imaging[9].

Less commonly EL can be located within the stomach *(Table 1)*. Huang et al[2]. reported a 44-year-old woman with abdominal pain who was found to have a small gastric submucosal mass. Endoscopic resection revealed a 3 × 2 × 1 mm, well-circumscribed reddish-brown lesion. Histology showed normal liver architecture with hepatocytes, portal spaces, and central vein. Special stains confirmed hepatocyte, bile duct, glycogen, and liver plate features, diagnosing ectopic liver tissue. Postoperative recovery was uneventful[2]. Vormittag-Nocito and Emmadi et al.[3], described a 73-year-old woman with anaemia, multiple myeloma, and atherosclerosis who underwent evaluation for a gastric fundic mass and pancreatic cyst. EUS revealed a 1.2 cm hypoechoic gastric lesion. Biopsy showed polygonal cells with eosinophilic cytoplasm. Immunohistochemistry confirmed hepatocytic origin (HepPar1+, CAM5.2+). Pancreatic cyst fluid was benign. Diagnosis: ectopic hepatocytes in the gastric wall[3]. Finally, Niimi et al.[10], reported a 31-year-old asymptomatic man who was found to have a 30 mm gastric submucosal tumour on endoscopy. EUS showed a 20 × 23 mm homogeneous hypoechoic lesion in the fourth gastric wall layer, and CT scan revealed an enhancing intragastric mass. EUS-guided fine needle aspiration demonstrated hepatocytes and bile duct structures, confirming EL tissue. Final diagnosis was gastric tumour from EL[10].

In our patient, the ectopic liver tissue was only biopsied using EUS-FNB, and not surgically resected, as histopathological examination showed entirely benign hepatic parenchyma with no evidence of dysplasia or malignancy. Current evidence suggests that asymptomatic EL tissue identified incidentally and confirmed to be benign on biopsy does not require removal. However, complete surgical excision is recommended when malignancy cannot be ruled out, when the lesion is symptomatic, or when it is discovered incidentally during another surgical procedure, due to the reported though rare risk of HCC arising in EL tissue.

Our case is unique because it describes EL tissue located in the gastric antrum of a male patient presenting with dyspepsia and heartburn. To date, only 3 cases of gastric EL have been reported, 2 in the pylorus and 1 in the fundus, making this the first documented case in the antrum. Furthermore, the lesion was identified through EUS-guided biopsy rather than incidental intraoperative discovery, highlighting the diagnostic value of minimally invasive endoscopic techniques in detecting such rare entities.

CONCLUSION

In conclusion, ectopic liver tissues in stomach are very rare and they should be looked for during histopathological examination. When identifying a well circumscribed submucosal mass within the gastrointestinal tract, EL tissue should also be taken into account in the differential diagnosis. Microscopic examination should be carried out to rule out pathological changes since development of hepatocellular carcinoma is possible.

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